

EXERCISES

For more practice, see *Extra Practice*.

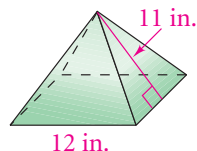
Practice and Problem Solving

A Practice by Example

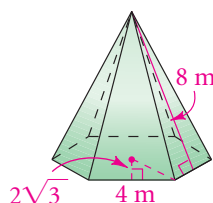
Example 1
(page 538)

Find the surface area of each pyramid to the nearest whole number.

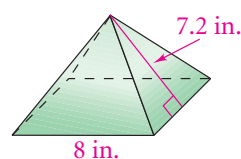
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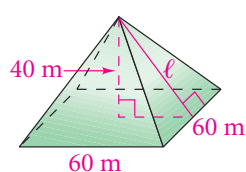
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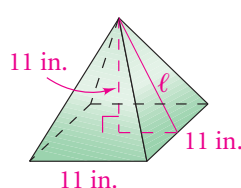
Example 2
(page 538)

Find the slant height ℓ of each pyramid to the nearest whole number.

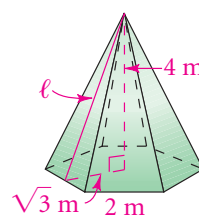
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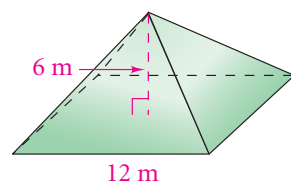


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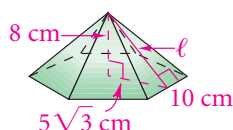


Find the lateral area of each pyramid to the nearest whole number.

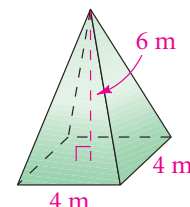
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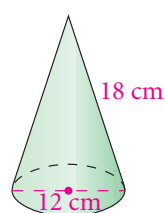


10. **Social Studies** The original height of the pyramid built for Khafre, next to the Great Pyramid, was about 471 ft. Each side of its square base was about 708 ft. What is the lateral area to the nearest foot of a pyramid with those dimensions?
11. **Construction** The roof of a tower is a square pyramid with side length 10 ft. The height of the pyramid is 6 ft. To the nearest square foot, find the area of the roofing material needed to cover the roof.

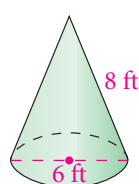
Example 3
(page 539)

Find the surface area of each cone in terms of π .

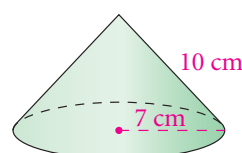
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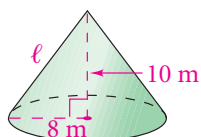
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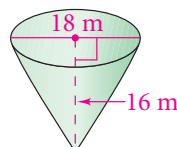
Example 4
(page 540)

Find the slant height ℓ of each cone to the nearest whole number.

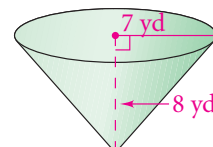
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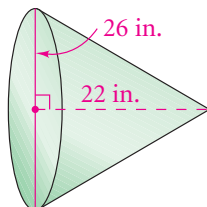


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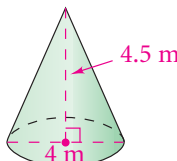


Find the lateral area of each cone to the nearest whole number.

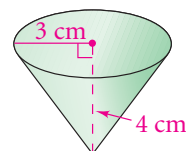
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B Apply Your Skills



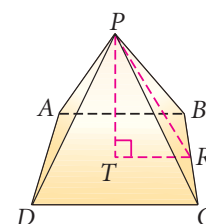
Need Help?

In Exercise 21, explain why \overline{PT} is shorter than \overline{PR} , and then why \overline{PR} is shorter than \overline{PC} .



21. **Writing** Explain why the altitude \overline{PT} in the pyramid at the right must be shorter than each edge \overline{PA} , \overline{PB} , \overline{PC} , and \overline{PD} .

22. **Reasoning** Suppose you could climb to the top of the Great Pyramid in Egypt. Which route would be shorter, a route along a lateral edge or along the altitude of a side? Which of these routes is steeper? Explain your answers.



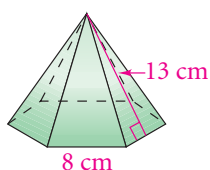
23. A square pyramid has base edges 10 in. long and height 4 in. Sketch the pyramid and find its surface area. Round your answer to the nearest tenth.



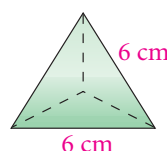
24. **Algebra** The lateral area of a pyramid with a square base is 240 ft^2 . Its base edges are 12 ft long. Find the height of the pyramid.

Find the surface area to the nearest whole number.

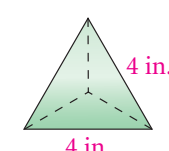
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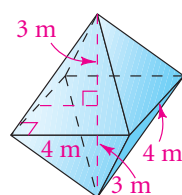
28. The lateral area of a cone is $48\pi \text{ in.}^2$. The radius is 12 in. Find the slant height.

29. **Open-Ended** Draw a square pyramid with a lateral area of 48 cm^2 . Label its dimensions. Then find its surface area.

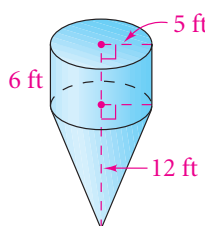
30. **Architecture** The roof of a tower in a castle is shaped like a cone. The height of the roof is 30 ft and the radius of the base is 15 ft. What is the area of the roof? Round your answer to the nearest tenth.

Find the surface area to the nearest whole number.

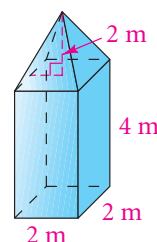
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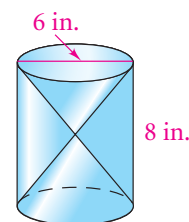
32.



33.



34. The hourglass shown at the right is made by connecting two glass cones inside a glass cylinder. Which has more glass, the two cones or the cylinder? Explain.
35. You can use the formula $S.A. = (\ell + r) r \pi$ to find the surface area of a cone. Explain why this formula works. Also, explain why you may prefer to use this formula when finding surface area with a calculator.



The length of a side of the base (s), slant height, height, lateral area, and surface area are measurements of a square pyramid. Given two of the measurements, find the other three to the nearest tenth.

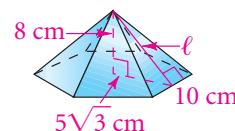
36. $s = 3$ in., $S.A. = 39$ in.² 37. $h = 8$ m, $\ell = 10$ m
 38. $\ell = 5$ ft, $L.A. = 20$ ft² 39. $L.A. = 118$ cm², $S.A. = 182$ cm²

Circumference, radius, slant height, lateral area, and surface area are measurements of a cone. Given two of the measurements, find the other three to the nearest tenth.

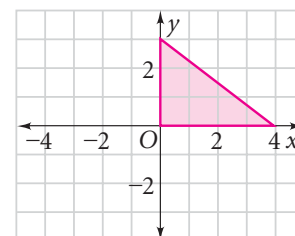
40. $r = 3$ ft, $S.A. = 50$ ft² 41. $r = 4$ m, $L.A. = 81.7$ m²
 42. $C = 44$ in., $L.A. = 176$ in.² 43. $\ell = 10.6$ ft, $L.A. = 33.3$ ft²

44. A cone with radius 9 cm has the same surface area as a cylinder with radius 6 cm and height 18 cm. What is the height of the cone to the nearest tenth?

45. Find the surface area of the hexagonal pyramid at the right.



Visualization The plane region is revolved completely about the given line to sweep out a solid of revolution. Describe the solid. Then find its surface area in terms of π .



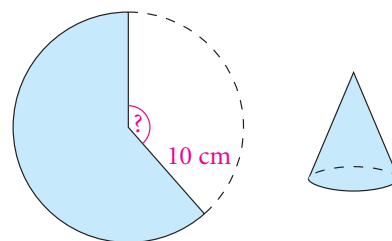
46. about the y -axis 47. about the x -axis
 48. about the line $x = 4$ 49. about the line $y = 3$


Challenge

The given figure fits inside a 10-cm cube. The figure's base is in one face of the cube and is as large as possible. The figure's vertex is in the opposite face of the cube. Draw a sketch and find the lateral and surface areas of the figure.

50. a square pyramid 51. a cone

52. A sector has been cut out of the disk. The radii of the part that remains are taped together, without overlapping, to form the cone. The cone has a lateral area of 64π cm². Find the measure of the central angle of the cut-out sector.



-  53. **Archaeology** Find out about ancient Mexican and Egyptian pyramids. How are they alike and different? Summarize your findings in a short report.
54. The lateral area of a cone is three fifths the surface area. Find the ratio of the radius to the slant height.



Standardized Test Prep

Multiple Choice

55. To the nearest whole number, what is the surface area of a cone with diameter 27 m and slant height 19 m?
A. 1378 m^2 B. 1951 m^2 C. 2757 m^2 D. 3902 m^2
56. To the nearest whole number, what is the surface area of a cone with radius 14 cm and slant height 18 cm?
F. 448 cm^2 G. 836 cm^2 H. 1012 cm^2 I. 1407 cm^2
57. To the nearest whole number, what is the surface area of a square pyramid with each side of the base 30 yd and slant height 42 yd?
A. 900 yd^2 B. 2520 yd^2 C. 3420 yd^2 D. 3600 yd^2
58. A cylinder and a cone each have height 1 and radius $\sqrt{3}$. How does the cylinder's lateral area x compare with the cone's lateral area y ?
F. $x = y$ G. $x = 2y$ H. $x > 2y$ I. $x < 2y$



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Short Response

59. A square pyramid is 8 m on each side. Its surface area is 240 m^2 . What is its slant height? Show your work and explain your reasoning.

Extended Response

60. The lateral area of a cone is twice the area of its base.
a. What is its slant height in terms of the radius r ? Show your work.
b. What is the lateral area to the nearest tenth if the radius is 6 centimeters? Show your work.

Mixed Review

Lesson 10-3

61. How much cardboard do you need to make a closed box that is 4 ft by 5 ft by 2 ft?
62. How much posterboard do you need to make a cylinder, open at each end, with height 9 in. and diameter $4\frac{1}{2}$ in.? Round your answer to the nearest square inch.

Lesson 9-3

63. A TV camera views a tall building 400 m away with a 35° angle of elevation to the top. How tall is the building if the camera lens is 160 cm off the ground?

Lesson 7-4

64. The area of a rhombus is 714 cm^2 . One diagonal is 42 cm long. Find the length of the other diagonal.
65. A kite with area 195 in.^2 has a 15-in. diagonal. How long is the other diagonal?